STATEMENT OF CONSIDERATIONS

CLASS ADVANCE WAIVER OF THE GOVERNMENT'S DOMESTIC AND FOREIGN PATENT RIGHTS AND COPYRIGHT UNDER DOMESTIC FIRST AND SECOND TIER SUBCONTRACTS ISSUED BY LLNL FOR ANL/LBNL/LLNL/LANL/ORNL/SNL FOR THE PATHFORWARD PROGRAM OF THE EXASCALE COMPUTING PROJECT; DOE WAIVER NO. W(C) 2016-003

The Department of Energy (DOE) has a long history of deploying leading-edge computing capability for science and national security. Going forward, DOE's compelling science, energy assurance and national security needs will require a thousand-fold increase in usable computing power, delivered as quickly and energy-efficiently as possible.

Within DOE's Office of Science (SC), the mission of the Advanced Scientific Computing Research (ASCR) Program is to discover, develop, and deploy computational and networking capabilities to analyze, model, simulate, and predict complex phenomena. A particular challenge of this program is fulfilling the science potential of emerging computing systems and other novel computing architectures, which will require numerous significant modifications to today's tools and techniques to deliver on the promise of exascale science.

Within DOE's National Nuclear Security Administration (NNSA), the mission of the Advanced Simulation and Computing (ASC) Program supports NNSA Defense Program's emphasis on predictive simulation-based science. Under ASC, computer simulation capabilities are developed to analyze and predict the performance, safety, and reliability of nuclear weapons and to certify their functionality. Modern simulations on powerful computing systems are key to supporting our national security mission. As the nuclear stockpile moves further from the nuclear test base through either the natural aging of today's stockpile or the introduction of modifications, the realism and accuracy of ASC simulations must further increase through development of improved physics models and methods requiring ever greater computational resources.

In 2016, the DOE will begin the Exascale Computing Project (ECP). ECP is a joint effort by the DOE Office of Science and the DOE National Nuclear Security Administration that will focus on advanced simulation through a capable exascale computing program emphasizing sustained performance on relevant applications and data analytic computing to support their missions. The hardware efforts in ECP seek to realize capable exascale systems in the 2023-2025 timeframe by building on the existing DOE-SC and NNSA/ASC investments in the FastForward and DesignForward Programs, software R&D, and application development and readiness projects.

The ECP plan is structured into four focus areas:

Application Development: The exascale application development effort will create and/or enhance important DOE applications through the development of models, algorithms, and methods; integration of software and hardware using co-design methodologies; systematic improvement of exascale system readiness and utilization; and demonstration and assessment of effective software/hardware integration.

Software Technology: To achieve the full potential of exascale computing, the software stack on which DOE SC and NNSA applications rely will be enhanced to meet the needs of exascale applications and evolved to utilize the features of exascale hardware architectures efficiently.

Hardware Technology: The Hardware Technology focus area supports vendor and lab hardware R&D activities required to design at least two capable exascale systems with diverse architectural features in support of exascale system acquisitions.

Exascale Systems: This area bridges the gaps between the usual scope of the DOE SC and NNSA HPC facilities and the extra resources required to field the first exascale systems. This focus area includes funding for non-recurring engineering (NRE) work beginning in 2019, supplemental acquisition funding, additional site preparations, and funding for prototypes and testbeds for application development and software testing. System procurement activities will be coordinated with the DOE HPC facilities' existing 2023 system acquisitions.

SC and NNSA jointly formed a consortium to participate in ECP which includes representation from six DOE Laboratories: Argonne National Laboratory (ANL), Lawrence Berkeley National Laboratory (LBNL), Lawrence Livermore National Laboratory (LLNL), Los Alamos National Laboratory (LANL), Oak Ridge National Laboratory (ORNL), and Sandia National Laboratories (SNL).

In July 2016, LLNL plans to release a Request for Proposal (RFP) on behalf of the consortium with the desired purpose of selecting responsive and responsible Offerors for the area of technology identified by the Hardware Technology (PathForward) Phase of the DOE Exascale Program.

The *PathForward* Phase of the DOE Exascale Computing Program

With the four-year FastForward and DesignForward Programs ending in 2017, DOE SC and NNSA have planned a follow-up program called PathForward. This new Program will focus on the hardware technology area.

PathForward seeks solutions that will improve application performance and developer productivity while maximizing energy efficiency and reliability of an exascale system. The

proposals submitted in response to this solicitation should:

1. Substantially improve the competitiveness of the vendor's exascale system proposals in 2019, where application performance figures of merit will be the most important criteria.

2. Improve the vendor's confidence in the value and feasibility of aggressive advanced technology options that they are willing to propose for the exascale system acquisitions.

3. Identify the most promising technology options that would be included in 2019 proposals for the exascale systems.

The proposals submitted in response to this solicitation should address the impact of the proposed R&D on both DOE extreme-scale mission applications as well as the broader HPC community. Offerors are expected to leverage the DOE SC and NNSA Co-Design Centers to ensure solution are aligned with DOE needs. While DOE's extreme-scale computer requirements are a driving factor, these projects should also exhibit the potential for technology adoption by broader segments of the market outside of DOE supercomputer installations. This public-private partnership between industry and the DOE will aid the development of technology that reduces economic and manufacturing barriers to building systems that deliver exascale performance, and the partnership will also further DOE's goal that the selected technologies should have the potential to impact low-power embedded, cloud/datacenter and midrange HPC applications. This ensures that DOE's investment furthers a sustainable software/hardware ecosystem supported by applications across not only HPC but also the broader IT industry. This breadth will result in an increase in the consortium's ability to leverage commercial developments. The consortium does not intend to fund the engineering of near-term capabilities that are already on existing product roadmaps.

This Program may fund additional projects under the PathForward phase of the Exascale Computing Project to be awarded by any consortium Laboratory. For example, vendors funded under PathForward may propose follow-on research in node or related system development.

The Allocation of Patent Rights

A small business or non-profit organization will retain the patent rights to its subject inventions under the Bayh-Dole Act. See 35 USC 200-212. These subcontracts will contain standard clause DEAR 952.227-11 Patent Rights--Retention by the Contractor.

For non-Bayh-Dole subcontractors, the Government retains title to subcontractor's subject inventions under DEAR 952.227-13 Patent Rights-Acquisition by the Government. However, a subcontractor that agrees to cost-share by an amount of at least 40% of the total cost of the subcontract shall qualify for this Class Advance Waiver where DOE agrees to waive, in advance, patent rights to the subcontractor such that it may elect its subject inventions. See

Appendix A, paragraph (b) of 10 CFR 784.12 PATENT RIGHTS—WAIVER (JUL 1996). The patent rights waiver is subject to the retained government-use license, march-in rights, reporting requirements, DOE approval of assignments, 35 U.S.C. 204, and a U.S. Competitiveness provision (paragraph (t)), which are all contained in the clause. See Appendix A.

If a non-Bayh-Dole subcontractor under the subject RFP does not agree to cost-share at least 40% of the total contract cost, that subcontractor will receive the standard DEAR patent and FAR data clauses in connection with the R&D procurement. However, such a subcontractor can still seek DOE Headquarters Program approval to have this Class Advance Waiver apply or petition the government for a separate Advance Waiver for its specific subcontract. If a subcontractor does not qualify for an advance waiver, there is a possibility that the subcontractor could petition for title for each subject invention by an Identified Invention Waiver process. However, HQ Program may deny that option during negotiations and the clause DEAR 952.227-84 Notice of Right to Request Patent Waiver should not be included in the subcontract.

The Allocation of Rights in Computer Software

The Bayh-Dole Act only applies to the allocation of patent rights. However, many subcontractors prefer to have advance rights in technical data developed under their subcontracts. Therefore, this Class Advance Waiver also allows a domestic subcontractor (small business, non-profit or for-profit organization) to assert copyright in computer software without the Contracting Officer's prior approval. Under the subject Pathforward program, DOE agrees, in advance, to authorize the subcontractor to assert copyright, without the Contracting Officer's prior approval, in software produced under the subcontract by its employees. See Appendix B, paragraph (c)(1)(iii). However, ASC/ASCR policy is that all funded software should be released as Open Source Software (OSS). This requirement shall apply to original software developed under the subcontract. However, if the software developed under the subcontract is a derivative work of existing subcontractor's software (i.e. Restricted Computer Software), then the derivative work can be commercially licensed by the subcontractor. In this situation, the right to assert copyright in software is subject to a limited government-use license to allow the subcontractor sufficient time to commercialize the computer software. In the limited government-use license, the subcontractor grants to the Government and others acting on its behalf, a paid-up nonexclusive, irrevocable worldwide license in such copyrighted computer software to reproduce, prepare derivative works, and perform publicly and display publicly by or on behalf of the Government. However, the limited government-use license in copyrighted software will revert to a broad Government license, which allows the Government to distribute copies to the public, if either the subcontractor abandons the commercialization of the software or DOE march-in rights are exercised, for example, where the subcontractor has not taken effective steps to commercialize the software. If the ASC/ASCR policy on OSS applies, then the Government will release the software as OSS and the broad Government license applies to allow distribution to the public without any restrictions.

The deliverables expected will be detailed reports of technical activities, performance results, and lessons learned associated with the endeavor. It is not expected that any software or hardware will be delivered to the Laboratories under the subcontracts. However, The Laboratories should consult with DOE Program to determine whether, if any, software developed under specific subcontracts should be delivered to DOE's Energy Science and Technology Software Center (ESTSC). DOE believes granting the copyright in software is warranted here in order to stimulate developed end products to purchase in the future.

The Delayed Release of Unpublished Data-Other Data

Since these subcontracts are for long-term commercialization activity, many companies will want to protect their data generated under the subcontracts from public release. However, DOE's policy (and statutory provisions) is to publicly release technical data that is funded by the U.S. Government. This policy promotes both the commercialization of the technology and the further development of knowledge in the academic/research community. However, many companies would be reluctant to enter into this subcontract if its competitors could have immediate access to the technology. DOE could limit the data delivered to the Laboratories and DOE; however, the Laboratories need to receive all the pertinent data necessary to carry out the objectives of the Government's program. Therefore, DOE Program supports a delayed release of up to five years of technical data developed under the subcontracts in order to allow the subcontractor the opportunity for a competitive advantage to commercialize this technology. There are several exceptions where DOE may release the data, for example, when responding to a request under the Freedom of Information Act (FOIA). See Appendix B, Rights in Data (modified), paragraph (d)(3) for a full list of exceptions.

Foreign Subcontracts

The provisions of this Class Advance Waiver do not automatically apply to any foreign owned or controlled subcontractors at any tier. However, the Laboratories should consult with DOE Patent Counsel and HQ Program to determine whether a foreign subcontractor could be granted the above rights or require the foreign subcontractor to submit a separate petition for an Advance Waiver to be approved by HQ.

Conclusion

This Class Advance Waiver and the terms of the intellectual property clauses included within the subject subcontracts are meant to cover the scope of the work under the Pathforward Program and shall not serve as precedent for any follow-on work to be negotiated separately with the selected subcontractors. Also, this Class Advance Waiver shall apply to second tier subcontracts that a first tier subcontractor issues. However, this Class Advance Waiver will not apply to foreign owned or controlled companies.

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DOE Patent Counsel will qualify each subcontractor by written certification by the Laboratory issuing the subcontract that this Class Advance Waiver is applicable. Such certification will include verification of the minimum percentage cost share by the subcontractor, a determination that the subcontractor is a U.S. company, and verification of the acceptability of the terms and conditions of the subcontract.

If any company does not qualify for this Class Advance Waiver or is not satisfied with the terms and conditions of the subcontract necessary to qualify for this Waiver, then that company may request to separately petition DOE for its own Advance Waiver and HQ Program will be consulted to determine if that is a possibility.

For the foregoing reasons, and in view of the objectives and considerations set forth in 10 CFR 784, it is recommended that the requested waiver be granted for domestic first tier and second tier subcontracts issued under the Pathforward program.

[redacted]

Date: [redacted]

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Based on the foregoing Statement of Considerations, it is determined that the interests of the United States and the general public will best be served by waiver of the United States' domestic and foreign patent rights, copyright in software copyright and delayed release of technical data as set forth herein, and therefore, the waiver is granted. Unless approved by DOE Program and DOE Patent Counsel, this waiver shall not apply to a modification or extension of the subcontracts where, through such modification or extension, the purpose, scope or DOE cost of the subcontracts has been substantially altered. This waiver shall not affect any waiver previously granted.

CONCURRENCE:

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